

4.2.6.11 2012 Annulus Visual Inspection Results Summary

The results of the comprehensive annulus inspections identified unexpected changes near in Risers 77, 83, 87, 89, and 90. All of the areas are located on the annulus floor or on the refractory except for Riser 89 where crystal-like growth was found on the primary top knuckle where the primary tank and the secondary liner converge. Figure 4-71 provides a visual summary of the inspections.

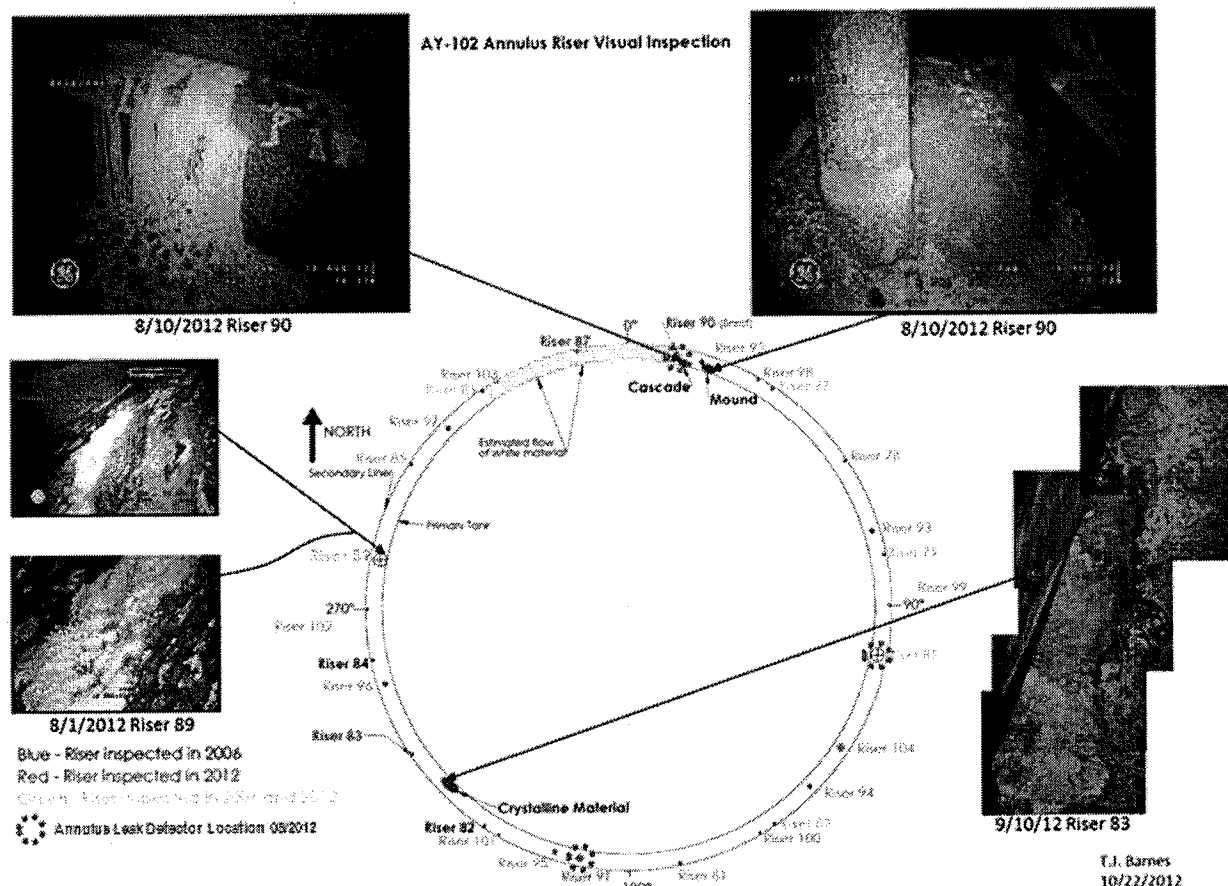


Figure 4-71. Tank AY-102 Visual Inspection Results

4.2.7 Samples 2012

An initial survey swab of the material in the Tank AY-102 annulus underneath Riser 90 occurred on August 10, 2012. Sample collection of material on the annulus floor near Riser 83 occurred on September 26, 2012. Further samples to characterize the material underneath Riser 90 were retrieved on October 15 and 17, 2012. The field sample collection and analytical results are described in this section as well as effects on the secondary liner should the primary tank waste leak to the annulus.

4.2.7.1 Riser 90 – August 2012

On August 10, 2012, survey swabs of the material on the annulus floor underneath Riser 90 were retrieved. Three surveys were collected using double-sided duct tape placed on a metal weight

and lowered into the annulus on a cable. The samples were placed into yellow plastic bags for transmittal to the 222-S Laboratory. The particles adhered to the duct tape had a measurable dose rate when retrieved from the annulus space, and a surface contamination reading of 800,000 dpm was reported with a detector near the sample material. The sample description and analysis are documented in RPP-RPT-53511, *Final Report for Tank 241-AY-102 Annulus Solids Sample Taken in August, 2012*.

Based on the appearance of the duct tape when received at the laboratory, it was decided to remove the double-sided tape, along with the sample, instead of attempting to scrape the sample off of the tape. The tape and sample were removed from the weight and then divided into four sections (see Figure 4-72). Each of the four sections appeared fairly homogenous due to appearance and dose rate. Most of the particulates observed on the tape appeared to be rust, with a few blue-colored flecks.

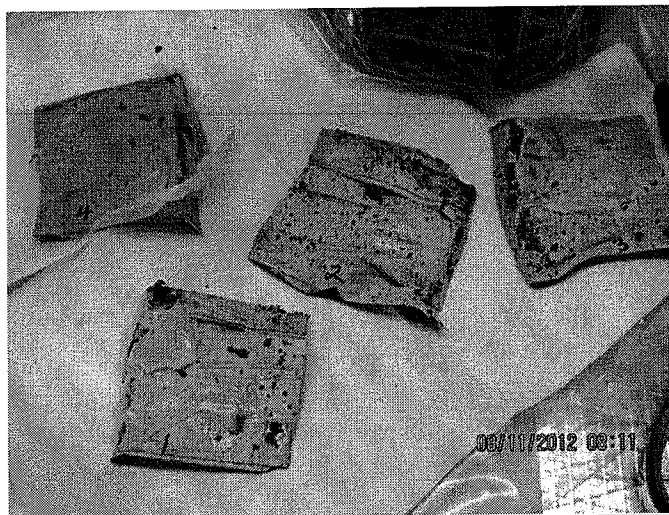


Figure 4-72. Tank AY-102 Riser 90 Duct Tape Survey of Residual Sample Material

Qualitative analysis of the particulates was completed using scanning electron microscopy (SEM) by removing individual particles from the duct tape and placing them on an adhesive tab on an SEM mount.

Results of the SEM analysis concluded that the particulate appeared to be dominated by rust, composed primarily of iron and oxygen, as expected.

The scattered blue particulate appeared to be a type of paint. Analysis by energy-dispersive X-ray spectroscopy (EDS) indicated a kaolinite mineral is the filler in the paint. Cellulose fibers were also present.

The remainder of the particulate was mostly light gray to amber-colored aggregates of fine-grained crystalline material. Several of these particles were examined. The chemistry was fairly uniform, with sodium, potassium, carbon, oxygen, nitrogen, phosphorous, and chlorine identified in the EDS spectra (see Figure 4-73). These sodium salt crystals are all water soluble phases that have been previously identified in Hanford tank waste. Tank AY-102 is known to also have high levels of potassium, which is less common in most tank waste.